

Urchins Barrens along the Monterey Peninsula & in Carmel Bay



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REEF CHECK CALIFORNIA

Citizen Science



SELECT A REGION: Central California

11079 Reef Check surveys worldwide

Zoom to:

Select Sites

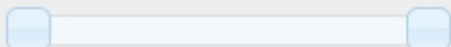
Select sites shown on map

- All Sites
- Central

Select Species

- All California Reef Check Species
 - Fish
 - Invertebrates
 - Seaweed
 - Invasive Algae Presence

Select Years



2006 - 2018

[Click to show selection on Map](#)

Reference Layers

- Distribution heat map (matching your filters)
- Reef Check survey sites
- California Marine Protected Areas
- California Depth Contours (50 ft)
- US National Marine Sanctuaries

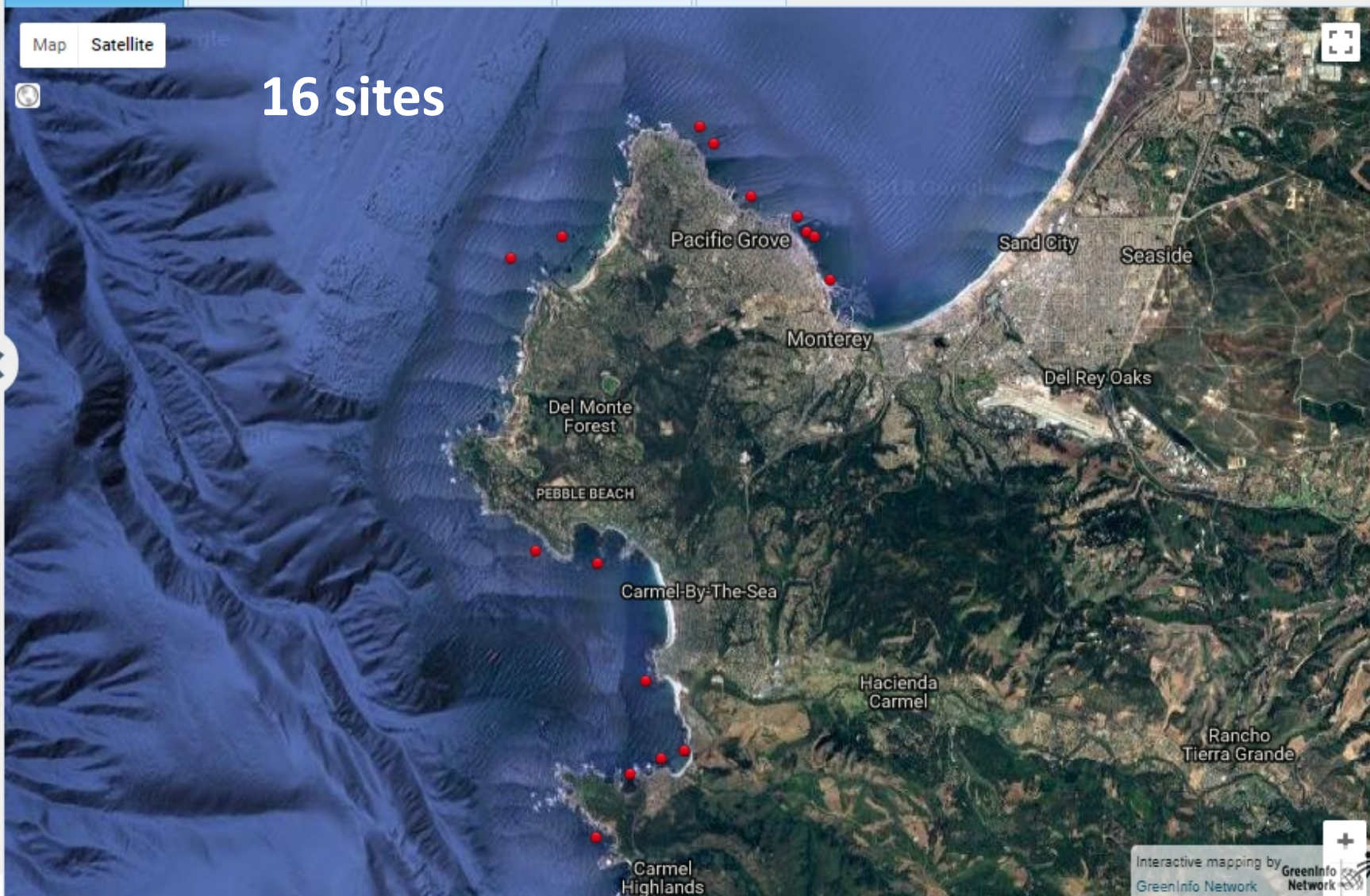
Analysis Tools

[Find Coordinates](#)
[Measure Distance](#)

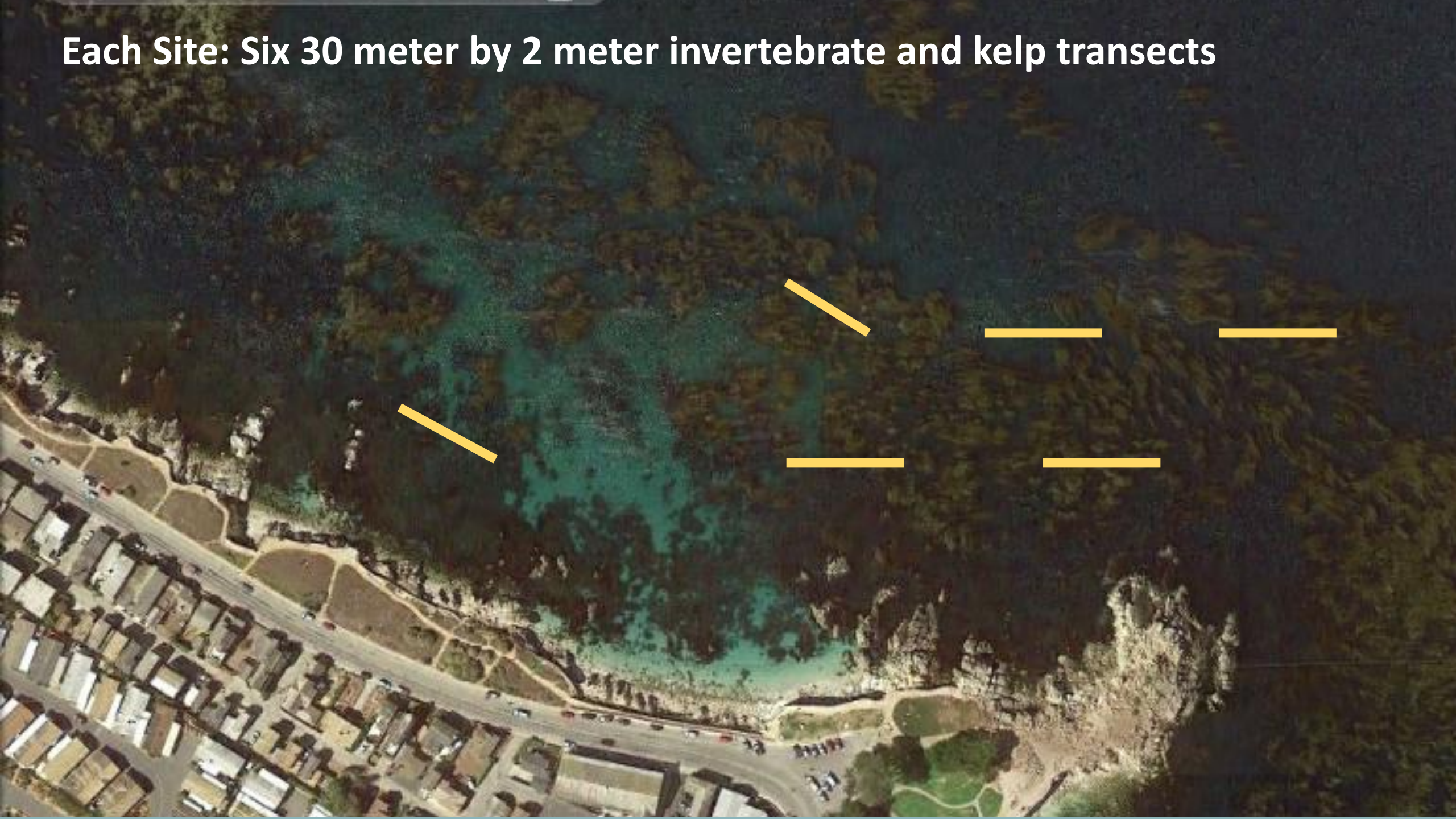
Data Entry Portals

[California data entry and photo upload](#)[Distribution Map](#)[Site Comparison](#)[Abundance Graph](#)[Time Graph](#)[Export](#)[Map](#)[Satellite](#)

16 sites



Each Site: Six 30 meter by 2 meter invertebrate and kelp transects



Unprecedented changes



- **2013 Sea Star wasting disease**
- **2014 Warm water blob**
- **2015 El Nino**
- **High recruitment of Purple Urchins (*Strongylocentrotus purpuratus*)**

Urchin Densities (60m²)

2013

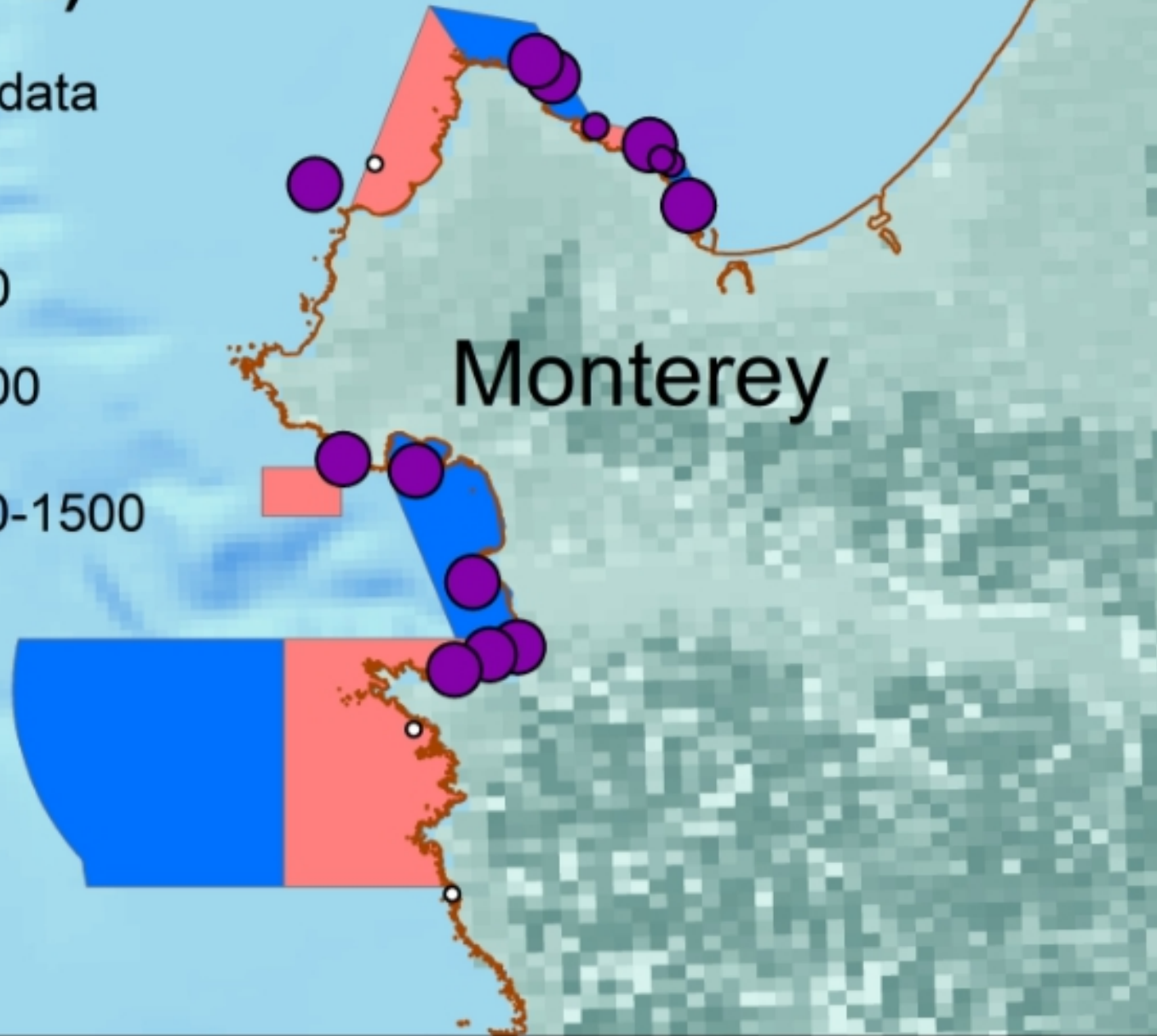
- no data
- <1
- <10
- <100
- 100-1500



Urchin Densities (60m²)

2014

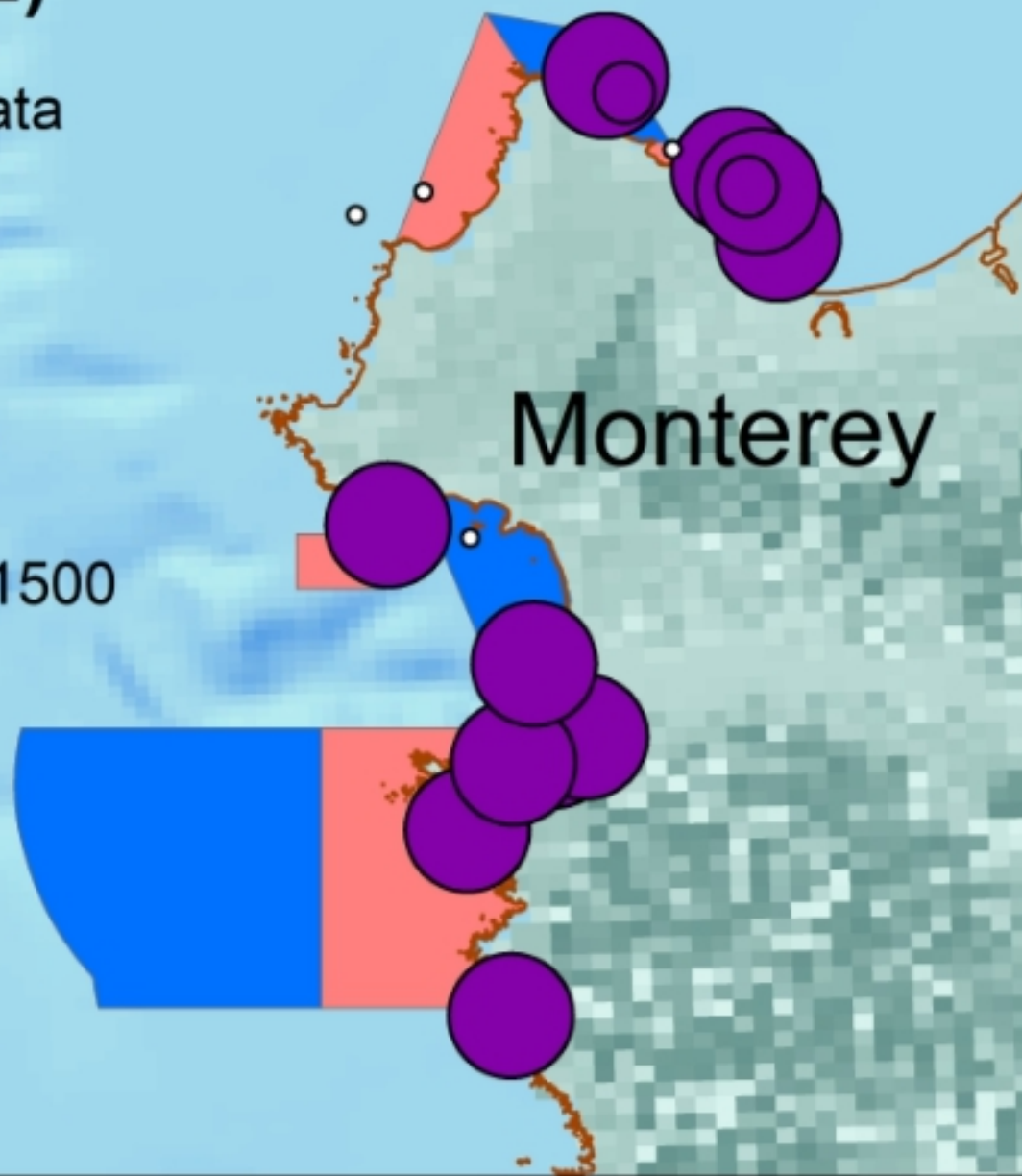
- no data
- <1
- <10
- <100
- 100-1500



Urchin Density (60m²)

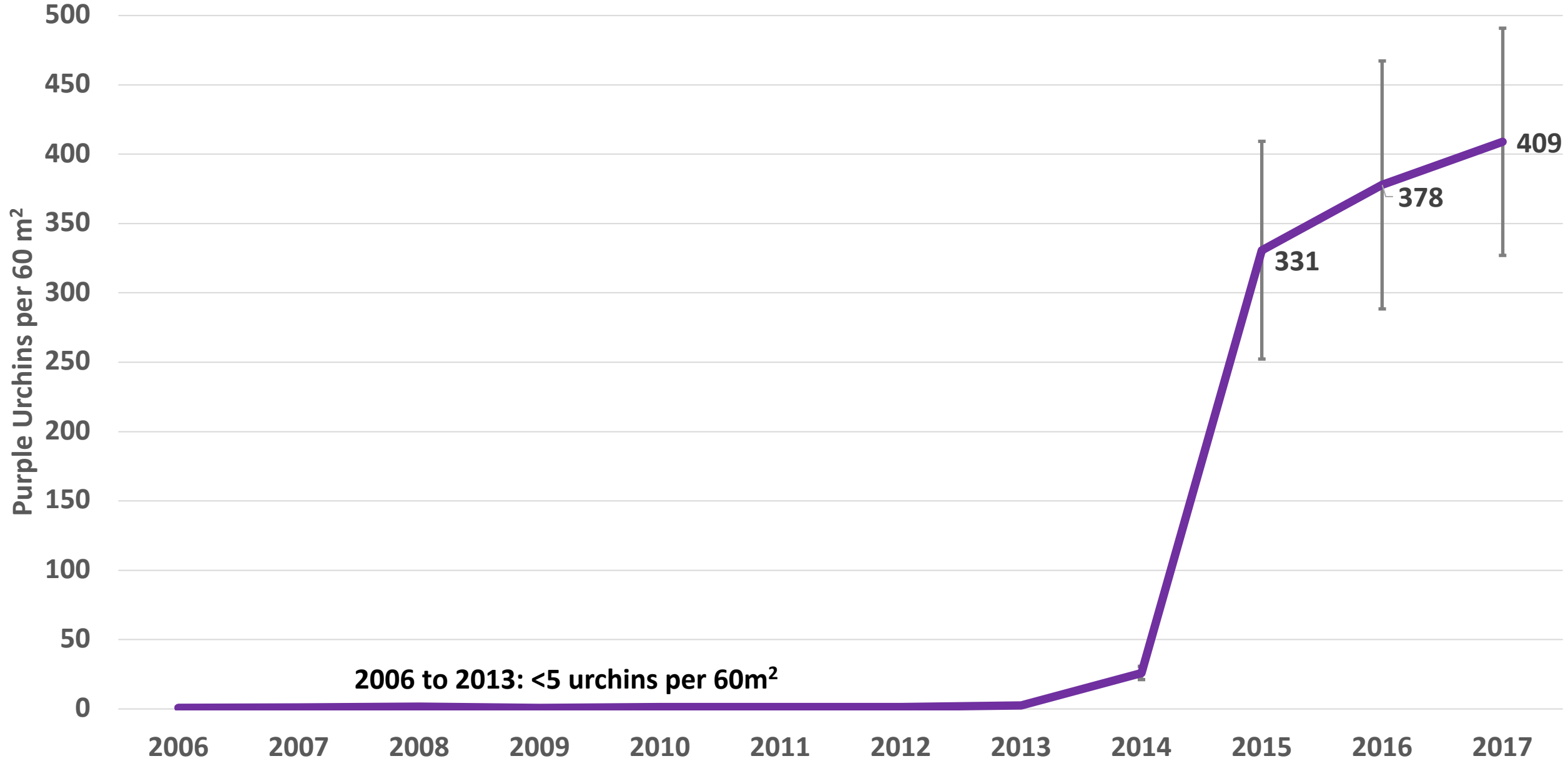
2015

- no data
- <1
- <10
- <100
- 100-1500



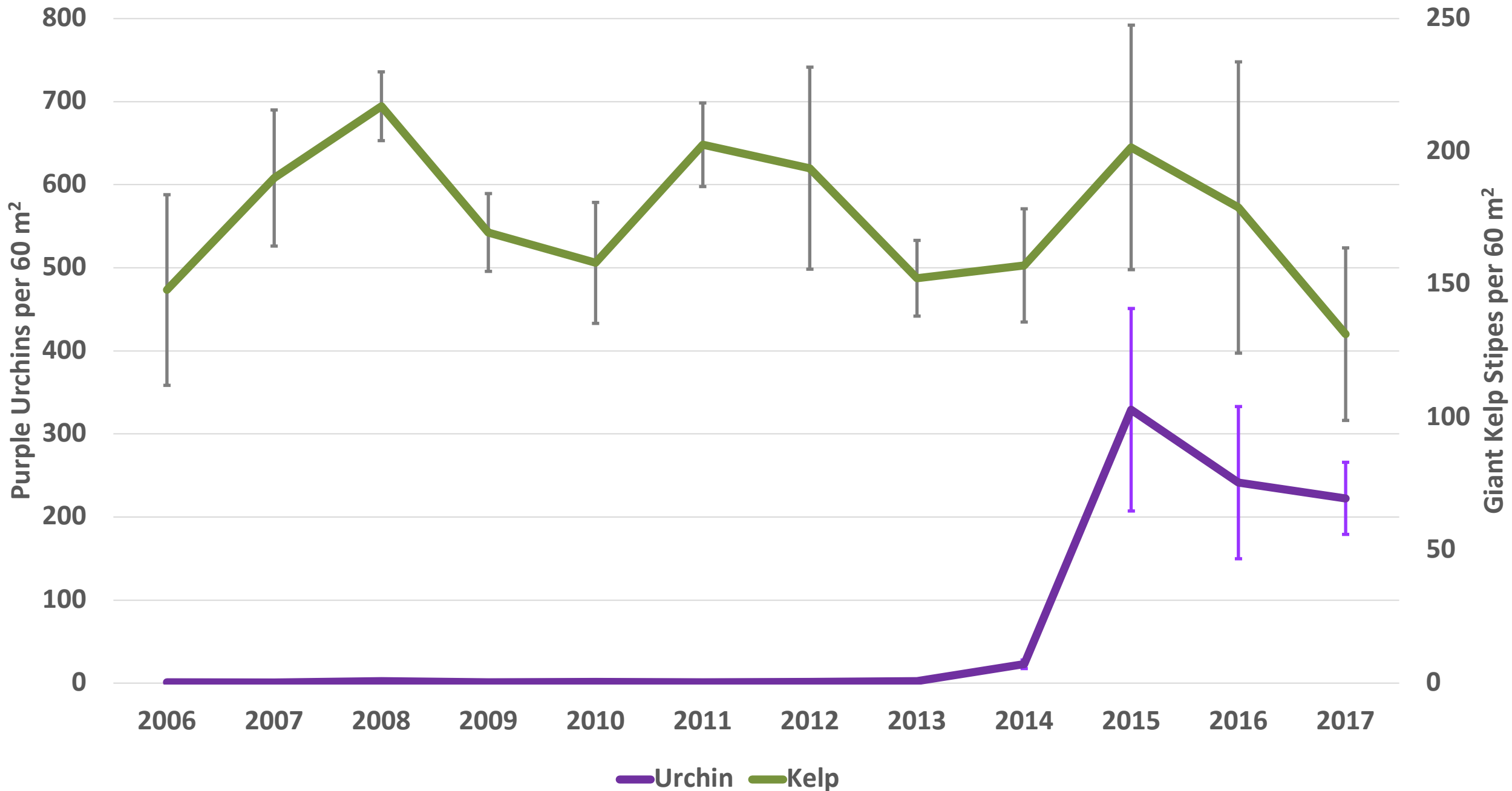
Monterey

Average Purple Urchin Density at Reef Check Sites Monterey Peninsula & Carmel Bay

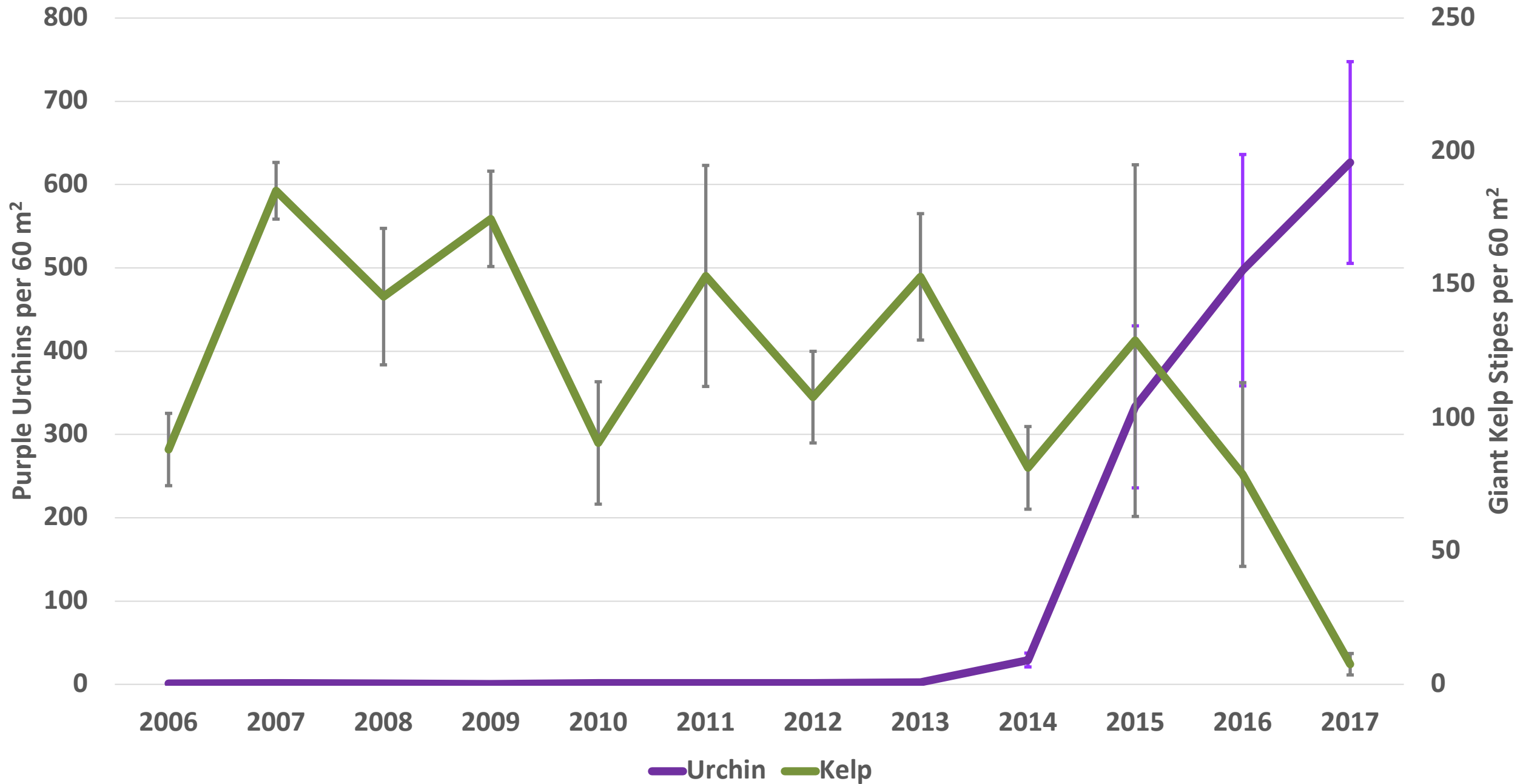




2017: Eight sites remain kelp forests



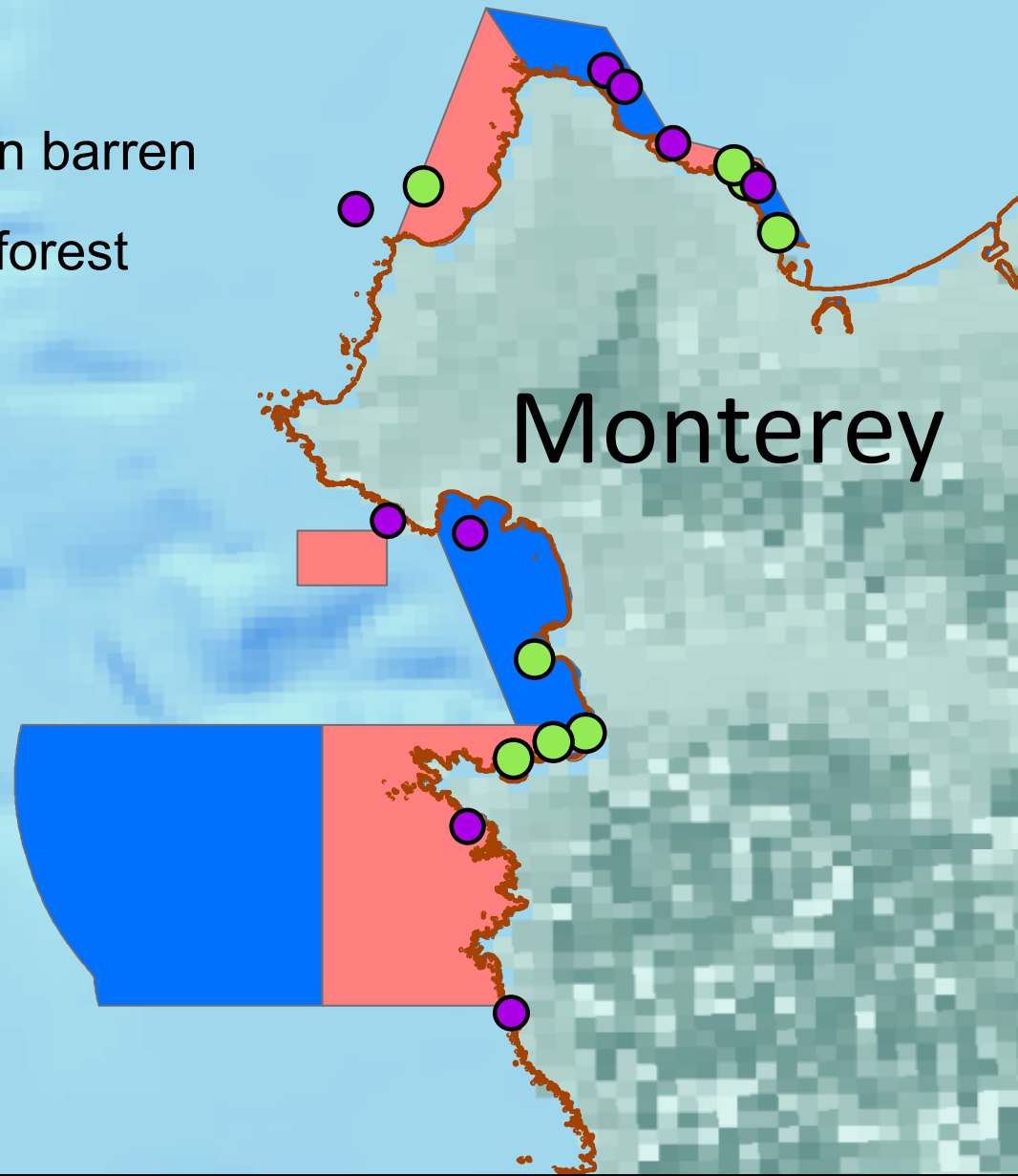
2017: Eight sites are urchin barrens



Urchin barrens

2017

- Urchin barren
- Kelp forest



Summary



- **Reef Check citizen scientists have monitored 16 sites in Monterey and Carmel Bay for over 12 years**
- **Recent disturbances: sea star wasting disease (2013), warm water blob (2014), El Nino (2015).**
- **Unprecedented changes to kelp forest ecosystem in Central California**
- **Purple sea urchins have deforested large areas of the kelp forest in Monterey and Carmel Bay**
- **This trend is not slowing down**